

Impact of Medical Waste Socialization on Medical Waste Management in Health Services Facilities

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Abstract

It is important to disseminate information about medical waste in health care facilities to provide knowledge and skills for paramedics, patients and the general public so that medical waste generated from each service facility can be managed properly and in accordance with applicable laws. When viewed from the amount of medical waste originating from health facilities, it is estimated that it will increase over time. The reason is that the number of hospitals, health centers, treatment centers, medical laboratories and health clinics is increasing. Thus, the purpose of writing this article is to determine the impact of socialization of medical waste on the handling of medical waste in health care facilities. The method used is Literature Review in a way that is used to collect data or sources related to a particular topic that can be obtained from various sources of English-language international journals sourced from the PubMed database, Google Schola, Semantic Scholar, Emerald Insight. Search results with keywords Socialization, Medical Waste, Handling, Health Service Facilities found 50 journals that match these keywords. A total of 37 journals from journals found according to the search keywords were then screened, 10 journals were excluded because full text articles were not available. Journals that meet the inclusion range of 5 full text journals are reviewed. So the conclusion is that the dissemination of information in health care facilities is very important in providing knowledge and skills for medical professionals, patients and the general public in managing medical waste.

Keywords: Socialization, Waste, Handling, Health Services

Introduction

Various wastes generated by health care facilities include gas, liquid and solid waste. Improper management will cause environmental pollution and other harmful impacts. For this reason, education is needed to increase the knowledge and ability of health care facilities in managing medical waste according to standards. In managing medical waste, health care facilities must have a management permit and a storage permit. If a health care facility uses the services of a third party, the third party must also have a permit (Assemu et al., 2020). Health service facilities as an effort to support development in the health sector are public service facilities, gathering places for sick and healthy people that allow environmental pollution, health problems and can be a place for disease transmission (Win et al., 2019).

Factually, he said, medical waste or B3 waste (hazardous and toxic materials) is a consequence of increasing the quality and quantity of health services, so the handling must also be in the framework of maintaining the health status of the community (Exposto & Sujaya, 2021). "That must be done in accordance with the procedures and provisions of the law. Regulations are intended as supervision as well as control not to be used by incompetent people. Therefore, socialization activities about medical waste in every health care facility are very important in

order to improve health and prevent disease. Environmental management of health facilities is an important part of a series of cycles and health facility management strategies to develop the capacity for environmental management of health facilities in providing services both indirectly to improving the quality of health services as a whole (Kenny & Priyadarshini, 2021).

In one study it was found that about 5.2 million people (including 4 million children) died from diseases caused by waste. Globally, waste in urban areas sharply doubled in 2000 and is estimated to increase 4 times by 2025 (Odette et al., 2014). Based on the results of this research, which later became AGENDA 21 by UNCED (United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil, which aims: All countries must establish criteria for waste management and disposal and develop environmental impact monitoring in 2000. By 2025, developing countries are expected to have disposed of at least half of their solid and liquid waste in accordance with national and international regulations.

Poor management of hospitals can be a source of nosocomial infections and environmental pollution that have an impact on the health of patients, visitors, health workers, and the surrounding community. In 2002, the results of an assessment conducted by WHO in 22 developing countries showed that the proportion of health care facilities that did not use proper waste disposal methods increased from 18% to 64% (Chartier et al., 2014). Hospital activities have both positive and negative impacts on the surrounding community. The positive impact is an increase in the degree of public health, while the negative impact includes producing hospital waste, both solid medical waste and non-solid medical waste that can cause disease and pollution that need special attention (Ghasemi & Yusuff, 2016).

Health service facilities (fasyankes) are health service facilities for the community. In addition to having a positive impact, hospitals also have a negative impact, namely producing waste during their activities, one of which is medical waste (Rachmawati et al., 2022). The medical waste produced must be managed to minimize the risk of environmental pollution) and health impacts (Srivastava et al., 2013). However, currently, most health care facilities dispose of medical waste directly to the environment (open dumping) or to a domestic waste final disposal site (TPA), management without a permit, processing that does not meet standards, limited medical waste treatment services, limited understanding to medical waste management for perpetrators and supervisory officers.

Referring to the impact, health facilities medical waste management requires collaboration and synergy from stakeholders related to the socialization of the impact of medical waste from health service activities in order to realize integrated and safe waste management from an environmental and human perspective (R et al., 2021). Socialization is a process of interaction and learning that is carried out by a human being in order to recognize the environment he will live in, both the physical and social environment (Crisogen, 2015). With the socialization process, a person can know, understand as well as carry out their rights and obligations based on their respective status roles according to the culture of the community. Furthermore, in the process of recognizing the rights and obligations of an adult human being, every individual or human needs to carry out socialization to study and develop patterns of social behavior with other members of society.

Socialization can be interpreted as any activity aimed at informing, persuading or influencing individuals or society to take action according to the information received (Karpov, 2016). For example, socializing about medical waste management to leaders or health workers in health facilities so that the medical waste produced is managed properly and does not cause negative impacts on patients, health workers, the community and the environment. One of the message theories associated with socialization is the theory of George Herbert Mead. In his theory

described in the book *Mind, Self, and Society* (1972) that this socialization raises a person's awareness in understanding his own role and the role of others. From Mead's views, it is clear that one's self is formed through interaction with other people (Morrison, 1936).

The implementation of socialization activities for handling medical waste in health care facilities can directly see the medical management process starting from storage until it is handed over to a 3rd party advanced manager so that all health service facilities, including hospitals, health centers and clinics, can manage the waste produced, especially medical B3 waste properly. In order to minimize the risks that may arise as a result of unmanaged medical waste in accordance with guidelines and laws (Bucătaru et al., 2021). In terms of medical waste management, health care facilities are carried out in collaboration with the government and the private sector so that the medical waste produced can be handled properly (Odette et al., 2014). It should be noted that the potential for health service activities that produce contaminants of medical waste, among others, is industry, hospitals, health centers, laboratories, maternity clinics, medical centers.

In fact, medical waste is a consequence of increasing the quality and quantity of health services, so the socialization intervention on the management of medical waste as a form of persuading or directing those in charge of health care facilities to handle it must also be in the framework of maintaining public health status (Irianti, 2013). "That must be done in accordance with the procedures and provisions of the law. Regulations are intended as supervision as well as control not to be used by incompetent people. Handling of medical waste must continue to be pursued, especially related to storage, collection, utilization, processing, stockpiling or destruction, so that this waste is truly safe for anyone (Wulandari & Kusnoputranto, 2015).

Furthermore, understanding and awareness of all stakeholders is needed, especially health service leaders, health workers and cleaners who take care of medical waste (Sahiledengle, 2018). Looking at the description above, the main purpose of this article review is to find out and understand the impact of socialization of medical waste on the handling of medical waste in health care facilities, starting from reduction, sorting, storage, transportation, to management at the final disposal site (TPA)

Methods

The study design used was Literature Review (LR). Literature review is a method used to collect data or sources related to a particular topic that can be obtained from various sources of International Journals, in English based on data bases (Semantic Scholar, Google Scholar, PubMed, DOAJ, Emerald Insight) and textbooks or handbooks that concerned with socialization regarding the handling of medical waste in health care facilities (Knopf, 2009).

The research design taken in this scientific research is mix methods, cross sectional studies, correlation analysis, comparative analysis and qualitative studies. The main intervention studied in this scientific research is the impact of socialization of medical waste on the handling of medical waste in health care facilities. The outcome measured in this scientific research is the impact of socialization of medical waste on the handling of medical waste in health care facilities.

Literature Search Results

Search publication articles on academic search complete, medline with full text, Semantic Scholar, Google Scholar, PubMed, DOAJ, Emerald Insight using selected keywords, namely: Socialization, Medical Waste, Handling, Health Service Facilities. Articles or journals that meet the inclusion and exclusion criteria are taken for further analysis. This Literature Review

uses literature published in 2012-2021 which can be accessed in full text in pdf and scholarly formats (peer reviewed journals). The criteria for the journals reviewed are English-language research journal articles with adult human subjects, the type of journal research articles is not a literature review with the theme of the impact of medical waste socialization on the handling of medical waste in health care facilities.

Journals that match the inclusion criteria and have a theme of the impact of medical waste socialization on the handling of medical waste in health care facilities are then reviewed. The journal criteria selected for the review are journals in which there is a theme of the impact of medical waste socialization on the handling of medical waste in health care facilities. The research inclusion criteria can be seen in the following table:

Table 1. Inclusion Criteria

Criterion	Inclusion
Period	Journals of the Year 2012-2021
Subject	Medical Waste
Language	English
Types of Articles	<i>Research Article</i> and <i>Review Article</i>
Content Theme	Medical waste management and medical waste handling

Based on a search with keywords Socialization, Medical Waste, Handling, Healthcare Facilities found 50 journals that match these keywords. A total of 37 journals from journals found according to the search keywords were then screened and 10 journals were excluded because full text articles were not available. Journals that meet the inclusion range of 5 full text journals are reviewed.

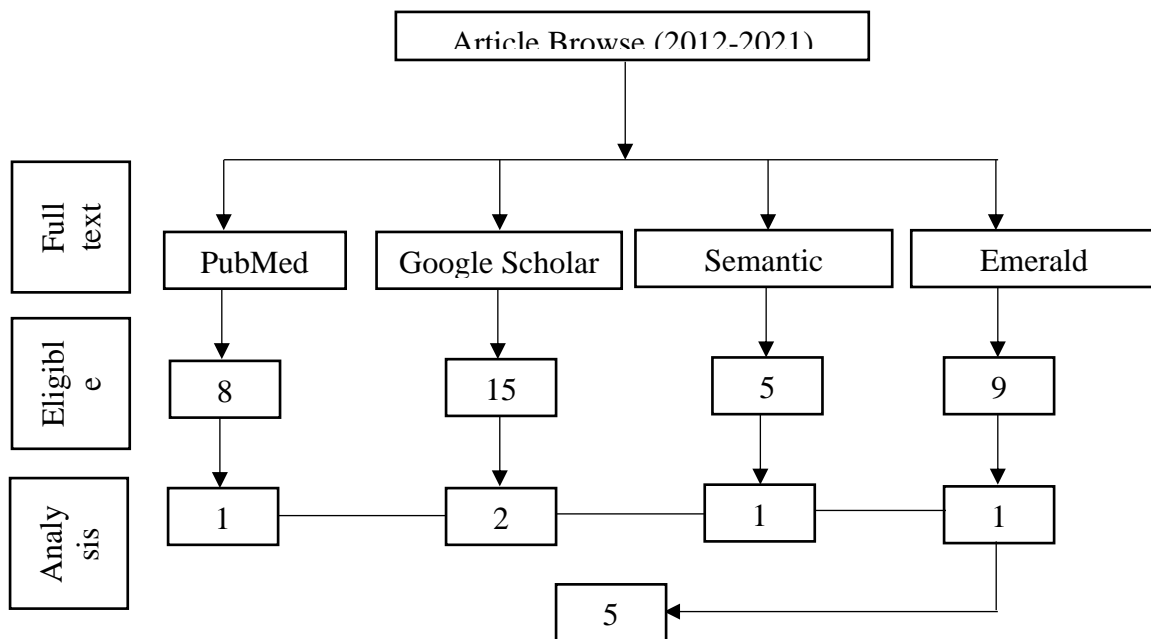


Chart.1. Article Selection Schema

Data Synthesis

The data synthesis process in this study was carried out in a narrative manner and the data synthesis refers to the purpose of reviewing articles, namely knowing and understanding "the impact of socialization of medical waste on the handling of medical waste in health care facilities". Research journals that match the inclusion criteria are then collected and a journal summary is made including the name of the researcher, the year of publication of the journal, the country of research, the title of the study, the method and a summary of the results or findings. The summary of the research journals is entered into a table sorted alphabetically and the year the journal was published and in accordance with the format mentioned above.

To further clarify the analysis of the abstract and full text of the journal, read and observe. The journal summary then analyzed the contents contained in the research objectives and research results/findings. The analysis used journal content analysis, then coding was carried out on the contents of the reviewed journals using psychospiritual categories. The data that had been collected was then searched for similarities and differences and then discussed to draw conclusions. So data synthesis is an opinion, idea, or new idea given by the author to solve the problems found.

Results and Discussion

Based on the description of the research method above, it is known that there are 5 scientific articles that were selected as the main articles to answer the purpose of conducting article reviews. The results of the articles collected, the authors get an analysis of the results of several reference articles as contained in table 1 below:

Table 2. Analisis Results of articles obtained

Name	Title	Methods	Result
Afriyanto, Somsak Pitaksanurat, Rittirong Junggoth, Noor Alis Setiyadi (2020)	Factors Affecting the Infectious Waste Management System on Practice Disposal Waste Among Health Workers in Bengkulu Hospital	cross sectional study	The total sample is 366 personal health including nurses 78.96%, midwives 8.20%, sanitation staff 0.27%, doctor 3.01%, pharmacist 1.09%, dentist 0.82%, administration staff 1.37%, nutrition officer 1.37%, supplier officer 1.09% and other occupation 3.83%. The multivariate analysis reported that practice disposal of infectious waste was associated significantly with working hour/day (Adjusted OR: 2.53,95% CI: 1.61 to 3.98) with p-value:<0.001.
Arjun Saha, Himadri Bhattacharjya (2018)	Health-Care Waste Management in Public Sector of Tripura, North-East India: An Observational Study.	cross-sectional study	Overall, 37.68% of the respondents had fair knowledge regarding HCWM, 8.27% received in-service training on HCWM, 66.17% were immunized against hepatitis B and > 90% of the respondents knew about segregation of waste at source but

			<p>knowledge regarding the use of colored bins for this purpose varied widely across different categories of participants. Housekeeping staff were ignorant about most of these issues. The importance of disinfecting the waste before disposal was known to 83.63% of the workers. Proper HCWM was practiced by 39.15% and segregation of waste at source into colored bins was followed by 23.3% of the respondents. The study revealed both waste management facilities and display of waste management policy as poor. Technical qualification and in-service training were identified as the statistically significant determinants of knowledge and practice of HCWM ($P < 0.05$).</p>
R. Azizah, Mahmudah, Suhariono, Izmi Dwira Eriyani, Supaporn Chaigarun (2019)	Management of Solid Medical Waste in Hospital a Logic Model Approach.	A Literature Review	Waste management medical solid at the hospital with the approach logic model shows that the situation of medical waste solid are risky, with priority decline in the number of medical waste solid, the inputs with the conditions of labor and technologies that exist, outputs the minimization of waste by recycling medical waste solid so that the outcomes will reduce the number of accidents, nosocomial infections and environmental pollution.
Aclan Ozder, Bahri Teker, Hasan Huseyin Eker, Selma Altindis, Merve Kocaakman, and Oguz Karabay (2013)	Medical waste management training for healthcare managers - a necessity?	Experimental	67.5% (162) of participants were female. 42.5% (102) are working in private, and 21.7% in state-owned hospitals. 50.4% are head-nurses, and 18.3% are hospital managers. A statistically significant difference was found among those who had received medical waste management training (preliminary test and final test) and others who had not ($p < 0.01$).
Mohd. Mainul Haque, Aruna	Observation on Medical Waste	Cross sectional study	The survey result shows that segregation of all wastes is not

Biswas*, Md. Sazzadur Rahman, Kaniz Bente Zaman and Md. Ashiquzzaman (2021)	Management System in Rajshahi Medical College Hospital, Bangladesh		conducted according to consistent rules and standards where some quantity of medical waste is disposed of with domestic wastes. The most frequently used treatment method for solid medical waste is incineration which is not done regularly at RMCH and the position of the incinerator is not acceptable. Clinical wastes pose a significant impact on health and the environment.
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From the 5 selected articles, it shows that the stages of medical waste management, the first stage are minimization and segregation, namely by avoiding the use of materials containing hazardous and toxic materials if there are other options; the second stage of collection and temporary storage by sorting which is carried out starting from the waste generator by placing a suitable container in each source/room according to the waste generated; the third stage of transportation carried out by a licensed transporter; and the last stage is managing it either by processing, burial, or stockpiling.

It was found that the infectious waste contained several pathogenic germs and organisms for infection and disease were not disposed of properly. The table below shows some examples of pathogenic bacteria and the diseases they cause.

Table 3. Risk of Medical Waste

Bacterial	Tetanus, gas gangrene and other wound infection, anthrax, cholera, other diarrhoeal diseases, enteric fever, shigellosis, plague etc
Viral	Various hepatitis, poliomyelitis, HIV-infections, HBV, TB, STD rabies etc.
Parasitic	Amoebiasis, giardiasis, ascariasis, ankylostomiasis, taeniasis
Echinococcosis	Malaria, leishmaniasis, filariasis etc
Fungal infections	Various fungal infections like candidiasis, cryptococcoses, coccidiomycosis etc.

Socialization of medical waste in health care facilities is very important to know the dangers of medical waste, so that at the time of collection it is not mixed and in the process of sorting and enforcing the rules for using PPE (Personal Protective Equipment) completely. In line with research conducted by Muluken, et al (2013) regarding waste management practices in health workers at health care facilities Gondar, Ethiopia stated that routine supervision and enforcement of rules also influence waste management practices (Muluken et al., 2013).

Socialization is the result of continuous individual adjustment to new situations where people learn to improve knowledge, attitudes and skills in taking action (Singh et al., 2020). The study proved that a statistically significant difference was found between those who had received medical waste management training (pre and post test) and those who had not ($p < 0.01$). It was observed that the level of information of all health care managers who had received training on waste management had increased after the training was completed (Ozder et al., 2013). This new act provides a conceptual understanding of the fundamental aspects of medical waste management.

Health facilities are one of the important sectors that have shown improvement worldwide over the last few decades. However, health activities can cause various types of waste that may have adverse effects on human health and the environment (Assemu et al., 2020). In particular, waste from health care activities requires special handling to mitigate potential negative impacts. Furthermore, activities in every health service facility, both government and private, medical waste management activities must start from every health service room in order to prevent disease transmission in health facilities (Nosocomial) (Afriyanto et al., 2020). Socialization is very important because it can strengthen the relationship between health workers, patients and society in general, can gain knowledge from a community, and can form a unique personality.

Health care facilities have an obligation to protect the environment and public health and have special responsibilities related to the waste generated. This is an obligation that must be owned by health care facilities, including ensuring that the handling, processing and disposal of waste carried out does not cause adverse health impacts for public health service providers and the environment (Munadi et al., 2021). The socialization also teaches each hospital about risk management to prevent unwanted events when providing health services. The application of risk management in hospitals helps identify and control incidents of work accidents that occur in hospitals, especially in the general and technical sections of the hospital.

The International Labor Organization (ILO) states that the Occupational Safety and Health Administration (OSHA) has a mission to prevent work-related injuries, illnesses, and deaths by enforcing regulations (standardization) for occupational health and safety. The objectives of OSHA are (a) to ensure the safety, health and well-being of people in the workplace, (b) to protect people in the workplace (other than people at work), (c) to promote a physiological and safe work environment. psychology of working people, (d) establishing a legal system based on industry regulations and practices in addition to the appointment of a deed (Rachmawati et al., 2022). Therefore, socialization is very important to do to find out the dangers of medical waste, so that at the time of collection it is not mixed and in the process of sorting and enforcing the rules for using PPE (Personal Protective Equipment) completely in accordance with applicable regulations.

Socialization on medical waste management is an effort that can be made to support the optimization of medical waste management related to its infectious nature, and allows it to contain viral particles as living genetic material. This is related to the increased risk that arises in the field of public health and environmental health, if not handled optimally (Muluken et al., 2013). Medical waste management strategies in health care facilities are absolutely necessary so as not to add to health problems through virus transmission that can occur if medical waste is not managed properly (Ghasemi & Yusuff, 2016). The amount of medical waste sourced from health facilities is estimated to increase over time, the cause is the number of hospitals, health centers, clinics and medical laboratories that continues to grow. In the implementation of socialization activities, strengthening is needed to implement effective and efficient medical waste management, including conducting regular monitoring and evaluation related to medical waste management in health care facilities. Through the implementation of socialization activities on medical waste management, it is expected to evaluate the long-term impact of increasing medical waste generation in every health care facility, especially the impact on health and the environment. Medical waste management in healthcare facilities must be balanced with the provision of medical waste management facilities.

Conclusion

In general, socialization is a teaching and learning process in behavior, especially the behavior of handling medical waste in health care facilities, so that the resulting waste cannot harm health workers, patients, society in general and the environment.

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